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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,286	07/31/2003	Laurel H. Carney	156 P 024	2622

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EXAMINER	
CHAWAN, VIJAY B	
ART UNIT	**PAPER NUMBER**
2626	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/631,286	CARNEY ET AL.	
	Examiner	Art Unit	
	Vijay B. Chawan	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-11 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-11 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 5 is objected to because of the following informalities: "attentutes" appears to be misspelled. Should it be "attenuates" instead?. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2, 4-6, 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carney et al., (" A New Angle on Detection: A Physiological Model for the Detection of Tones in Noise", Conference on Processing the Auditory Environment From Synaptic Mechanisms to Population Codes, NYU June 10-11, 2001), in view of Fullerton et al., (6,031,862).

As per claim 1, Carney et al., teach a system for reducing noise in a wideband signal having at least one narrow frequency component comprising:

a filterbank comprising a first filter having a first frequency and a first output and a second filter having a second frequency and a second output, wherein the phases of said first frequency and said second frequency differ by 180 degrees about a third

frequency (figure of phase vs. frequency on page 1 shows a first filter having a center frequency lower than the target frequency of 900 Hz, and, a second filter having a center frequency higher than the target frequency of 900 Hz, and at the end of page 1, "At the frequency... the two filters are 180° out of phase...).

However, Carney et al., do not specifically teach a running cross-correlator interconnected to said first filterbank for comparing said first output of said first filter and said second output of said second filter, and, an analysis-synthesis filterbank for attenuating said wideband signal at said third frequency in response to said running cross-correlator.

Fullerton et al., do teach a running cross-correlator interconnected to said first filterbank for comparing said first output of said first filter and said second output of said second filter, and, an analysis-synthesis filterbank for attenuating said wideband signal at said third frequency in response to said running cross-correlator (Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention, to incorporate the cross correlator as taught by Fullerton et al., in the system of Carney et al., because this would provide lower signal distortion by reducing baseband noise for high reliability voice, data or imagery communications (Fullerton, Col.17, lines 58-61).

As per claim 2, Carney et al., in view of Fullerton et al., teach the system of claim 1, further comprising first and second saturating non-linearity components interconnecting said first filter and said second filter, respectively, to said running cross-correlator correlation (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

As per claim 4, Carney et al., in view of Fullerton et al., teach the system of claim 1, wherein said running cross-correlator comprises a cross-correlator interconnected to a low-pass filter correlation (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

As per claim 5, Carney et al., in view of Fullerton et al., teach the system of claim 1, wherein said second filterbank attentutes said third frequency only when said running cross-correlator has a reduced response correlation (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

As per claim 6, Carney et al., teach a method for reducing noise in a wideband signal, comprising the steps of:

(a) filtering said wideband noise at a first frequency to produce a first

filter output,(b) filtering said wideband noise at a second frequency to produce a second filter output, wherein the phases of said first frequency and said second frequency differ by 180 degrees about an intermediate third frequency (figure of phase vs. frequency on page 1 shows a first filter having a center frequency lower than the target frequency of 900 Hz, and, a second filter having a center frequency higher than the target frequency of 900 Hz, and at the end of page 1, "At the frequency... the two filters are 180° out of phase...).

However, Carney et al., (c) performing a running cross-correlation of said first filter output and said second filter output, and, (d) attenuating said wideband signal at said third frequency according to said running cross-correlation. Fullerton et al., do teach performing a running cross-correlation of said first filter output and said second filter output, and, attenuating said wideband signal at said third frequency according to said running cross-correlation (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

As per claim 8, Carney et al., in view of Fullerton et al., teach the method of claim 6, further comprising the step of amplifying said wideband signal at said third frequency if said running cross-correlation has a low value (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

As per claim 9, Carney et al., in view of Fullerton et al., teach the method of claim 6, further comprising the steps of (a) filtering said wideband noise at a fourth frequency to produce a fourth filter output; (b) filtering said wideband noise at a fifth frequency to produce a fifth filter output, wherein the phases of said fourth frequency and said fifth frequency differ by 180 degrees at an intermediate sixth frequency; (c) performing a running cross-correlation of said saturated fourth filter output and said saturated fifth filter output; and (d) attenuating said wideband signal at said sixth frequency according to said running cross-correlation (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

As per claim 10, Carney et al., in view of Fullerton et al., teach the method of claim 9, further comprising the step of combining the attenuated signals of steps (d) and (j) (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17, line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

As per claim 11, Carney et al., in view of Fullerton et al., teach the method of claim 6, wherein the step of attenuating said wideband signal at said third frequency according to said running cross-correlation comprises passing said wideband signal through an analysis-synthesis Filterbank (Fullerton - Fig.24- Cross correlator (1408), low pass filter (1428)) for comparing first and second transfer functions over time (Col.17,

line 39-45, the transfer function signals are similar to these signals as they change over time, Fig.18).

4. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carney et al., (" A New Angle on Detection: A Physiological Model for the Detection of Tones in Noise", Conference on Processing the Auditory Environment From Synaptic Mechanisms to Population Codes, NYU June 10-11, 2001), in view of Fullerton et al., (6,031,862)., as applied to claims 2 and 6 above, and further in view of Minto (5,757,641).

As per claims 3 and 7, Carney in view of Fullerton teach the system and method of claims 2 and 6. However they do not specifically teach the system and method wherein said first and second saturated non-linearity components are signum functions and transforming said first filter output and said second filter output with a saturated non-linearity component function prior to performing said running cross-correlation. Minto teaches that each filter comprises a signum function coupled to it (Figure 3, (147-filter)(143-signum function)), in order to perform the computation converting each signal to a (+1), (-1), or zero, thus performing a non-linear function to a signal (Col.5, lines 28-42).

Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention, to have a signum function perform a non-linear function on the output of each filter as taught by Minto, in the system and method of Carney et al., in view of Fullerton et al., this would provide the user with a local channel residual error signal (Col.5, lines 28-31).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Carney et al., ("Auditory Phase Opponency: A Temporal Model for Masked Detection at Low Frequencies", ACTA Acoustica United with Acoustica, vol.88, Jan 7, 2002) pages 334-337.

Witzgall et al., (7,103,537) teach a system and method for linear prediction.

Brennan et al., (7,110,554) teach sub-band adaptive signal processing in an oversampled filterbank.

Bi (5,623,485) teaches a dual-mode division multiple access communication system and method.

Kaiser (5,339,284) teaches a signal processor for elimination of sidelobe responses and generation of error signals.

Franklin et al., (4,363,138) teach a signal presence detector and method.

Carney et al., (7,042,221) teach a system and method for detecting a narrowband signal.

Rainton (5,724,485) teaches an adaptive cross correlator apparatus comprising adaptive controller for adaptively adjusting transfer functions of two filters.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vijay B. Chawan whose telephone number is (571) 272-7601. The examiner can normally be reached on Monday Through Friday 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571) 272-7602. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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3/18/07

VIJAY CHAWAN
PRIMARY EXAMINER